CHEMISTRY

Corresponding Member of the Academy of Sciences of the USSR
M. M. KOTON and F. S. FLORINSKII

1961

SovietRxiv

Abstract

Full Text

CHEMISTRY

Corresponding Member of the Academy of Sciences of the USSR M. M. KOTON and F. S. FLORINSKII

SYNTHESIS OF POLYMERIZABLE ORGANOANTIMONY ACRYLATES AND METHACRYLATES

Recently, derivatives of acrylic and methacrylic acids containing atoms of mercury (⁀1), lead ([1,]2), tin ([3-]5), and germanium (⁀6) have been synthesized. In continuation of these studies, we have for the first time synthesized organoantimony derivatives of acrylic and methacrylic acids.

The following were synthesized: diphenylstibine acrylate
CH_2=CHCOOSb(C_6H_5)$_2$
and diphenylstibine methacrylate
CH_2=C(CH_3)COOSb(C_6H_5)$_2$.

The synthesis of unsaturated organoantimony compounds was carried out by the interaction of diphenylstibine oxide and acrylic (methacrylic) acid in methanol solution, according to the equation:

$$((C_6H_5)_2Sb)_2O + 2CH_2{=}CRCOOH \rightarrow 2CH_2{=}CRCOOSb(C_6H_5)_2 + H_2O,$$

$$R = H,\ CH_3$$

These substances are colorless crystalline compounds, soluble in organic solvents. They readily polymerize in bulk and in solution, and also form copolymers with various vinyl monomers.

Experimental Part*

Diphenylchlorostibine was obtained by the interaction of tetraphenyltin with antimony trichloride, converted into the corresponding acetate, which was transformed into diphenylstibine oxide with m.p. 78° (⁀7).

Diphenylstibine acrylate was obtained as follows. To a boiling solution of 5.7 g (0.01 mole) of diphenylstibine oxide in 50 ml of methanol was added a solution of 2.1 g (0.03 mole) of acrylic acid in 15 ml of methanol; the reaction mixture was heated on a water bath for 1 hr. After removal of the methanol, the residue was treated with *n*-hexane, and upon cooling a crystalline precipitate separated

from the solution. After two recrystallizations from *n*-hexane, colorless crystals with m.p. 115–117° were obtained. Yield 5.1 g (74% of theory).

Found, %: C 51.80; 52.12; H 4.24; 4.26; Sb 35.00; 35.43
$C_{15}H_{13}O_2$. Calculated, %: C 51.87; H 3.74; Sb 35.15

Diphenylstibine methacrylate was obtained by an analogous method, using, per 5.7 g (0.01 mole) of diphenylstibine oxide, 2.6 g (0.03 mole) of methacrylic acid. 5.5 g of colorless crystals were obtained after two recrystallizations from *n*-hexane, m.p. 113–115°.

Found, %: C 53.47; 53.14; H 4.81; 4.75; Sb 33.80; 33.57
$C_{16}H_{15}O_2$. Calculated, %: C 53.18; H 4.15; Sb 33.79

* With the participation of S. V. Troitskii.

Diphenylstibine acrylate and methacrylate have an irritating effect on the upper respiratory tract, causing sneezing.

The monomers obtained polymerize readily in bulk and in solution (toluene) upon heating in the presence of azobisisobutyronitrile (as initiator).

The polymers obtained are insoluble in organic solvents and have a high softening temperature. They readily copolymerize with methyl methacrylate and styrene, forming hard, colorless thermoplastic masses.

Institute of Macromolecular Compounds
Academy of Sciences of the USSR

Received
20 I 1961

REFERENCES

1. M. M. Koton, T. M. Kiseleva, F. S. Florinsky, *Vysokomolek. soed.*, **2**, 1639 (1960).
2. D. A. Kochkin, *DAN*, **135**, 857 (1960).
3. J. Montermoso, T. Andrews, L. Marinelli, *J. Polym. Sci.*, **32**, 523 (1958).
4. M. M. Koton, T. M. Kiseleva, V. A. Paribok, *DAN*, **125**, 1263 (1959).
5. D. A. Kochkin, V. N. Kotrelev et al., *Vysokomolek. soed.*, **1**, 482 (1959).
6. G. S. Kolesnikov, S. L. Davydova, N. V. Klimentova, *Vysokomolek. soed.*, **2**, 563 (1960).
7. H. Schmidt, *Lieb. Ann. Chem.*, **421**, 235 (1920).

Note: Figure translations are in progress. See original paper for figures.